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(54) Method and system for converting tissue paper through simultaneous use of paper mill reels having different characteristics to one another

(57) A method and system are described for producing packs of tissue paper products having different characteristics to one another. More specifically, a system is described for producing packs comprising rolls (L) of toilet paper and kitchen towel.

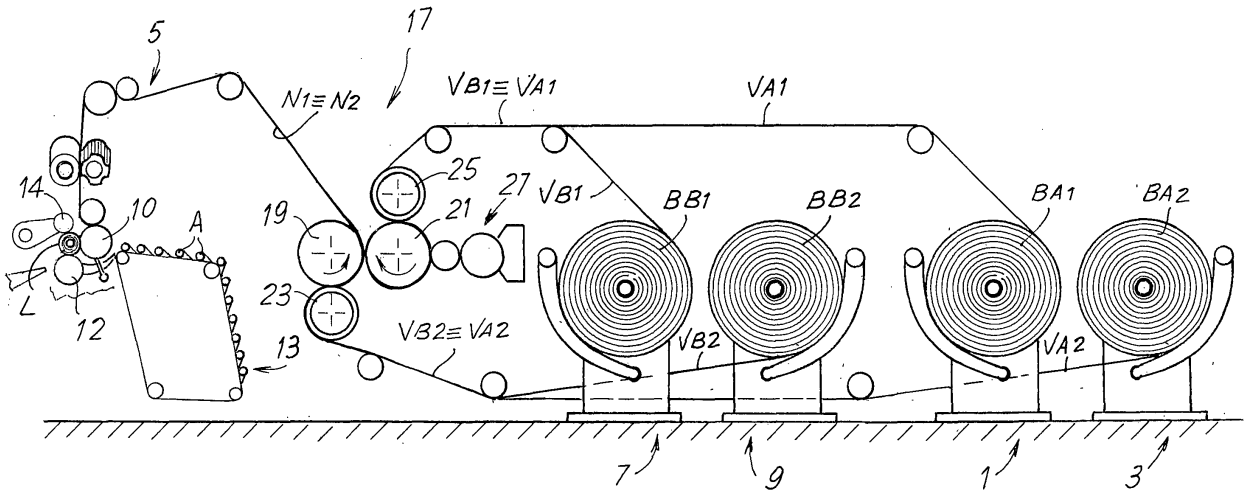

Fig. 1

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Description

Technical background

[0001] The present invention relates to systems and methods for converting paper, more specifically tissue paper, with which rolls of toilet paper, kitchen towel, paper handkerchiefs, paper napkins and the like are produced.

State of the art

[0002] To produce tissue paper products a ply of cellulose fibers is normally formed with a dry or - more frequently - wet technique. In the latter case, the ply is obtained by distributing a pulp of cellulose fibers on a forming screen and then gradually draining the water to obtain a ply of sufficient consistency, which is dried in a suitable way, using a Yankee drum, a TAD system or the like.

[0003] The dried ply is then wound in reels of large diameter. These reels are subsequently converted, using converting lines, into the finished product. Typically, one or more reels of cellulose ply are unwound to feed the continuous web material to converting machines that produce finished products in the form of rolls, packets of handkerchiefs, packets of napkins or the like.

[0004] The composition of the ply of cellulose fibers changes as a function of the final use for which the product produced with the ply of cellulose fibers is intended.

[0005] For example, to produce kitchen towel or similar products, a certain quantity of one or more wet strength resins is added to the pulp of cellulose fibers with which the ply is formed; these are resins that give the paper ply at least temporary mechanical strength when wet. This allows said type of paper to be used to clean and dry washable surfaces, for culinary uses and the like, or also as paper sheets replacing conventional cloth towels.

[0006] Examples of wet strength resins for these uses are described in the following United States patents: 6,852,197; 6,702,923; 6,423. 179; 6,207,013; 6,149,769; 6,059,928; 5,760,212; 5,264,082; 5,138,002; 4,981,557. The content of these documents forms an integral part of the present description.

[0007] As these resins are added to the pulp of cellulose fibers and water, the entire ply produced in the continuous machine has substantially the same composition and the same wet strength characteristics. Typically, a system is used to produce plies of cellulose fibers in which the pulp is fed continuously onto a felt or cloth through one or more headboxes. An example of a headbox for this use is described in the patent USA n. 5,560,807.

[0008] In products intended for other types of use wet strength is not desired, but is instead a disadvantage. In particular, in the production of toilet paper the ply of cellulose fibers must disintegrate upon contact with water to allow easy disposal in waste water systems, preventing pipes from clogging and facilitating decomposition in septic tanks and purification plants. In this case wet strength resins are not added to the cellulose pulp with which the ply of tissue paper is produced, or only a minimum quantity is added.

[0009] It is clear from the above that a reel for producing paper without wet strength (toilet paper) or alternatively with wet strength for producing kitchen towel or the like is fed time by time to a production line or to a converting line.

[0010] To switch from one production to the other in the same system it is first necessary to finish the reels of paper present in the unwinder that feeds the line, or to replace partially used reels with others of different composition. This operation is complicated and requires long periods of line downtime, which has a negative influence on productivity and consequently on the cost of the finished product, especially considering that paper converting lines operate at ply speeds that can reach and exceed 1000 m/min.

[0011] This makes the production line somewhat inflexible or in any case increases the economic charges of production and consequently the cost of the finished product.

Objects and summary of the invention

[0012] According to a first aspect, an object of a possible embodiment of the present invention is to provide a production method or process that allows greater flexibility to be obtained, or products intended for different uses to be produced even simultaneously on the same line for converting a web material and preferably a cellulose material typically in the form of a web or ply.

[0013] Cellulose material is intended, in general, as a semi-finished material obtained by depositing one or more layers containing cellulose fibers. According to a particularly advantageous embodiment, the invention relates in particular to a method for processing or converting a ply or a plurality of plies of tissue paper obtained by a wet process, i.e. in which the ply containing cellulose fibers is obtained from an aqueous suspension of cellulose fibers and any other components, additives, fillers, or the like required. However, the present invention can also be applied to "dry" production, converting or manufacturing processes of plies, layers or sheets of paper, i.e. obtained using the air-laid technique, in which the cellulose fibers are deposited to form a ply, subsequently consolidated in a suitable manner, without being carried in an aqueous suspension.

[0014] According to a different aspect, an object of one embodiment of the present invention is to provide a system or line for converting tissue paper or other cellulose material, which is more flexible, or which allows even simultaneous production of products intended for different uses.

[0015] According to a further aspect, an object of an embodiment of the invention is to provide a method or a production system or line that allows the production of mixed packs containing products intended for different

uses, such as kitchen towel and toilet paper.

[0016] Hereunder, reference will frequently be made to a product based on tissue paper, as the present invention allows particular advantages and benefits to be attained when applied to this type of material. However, it must be understood that the invention is not limited to this particular type of material, as in some cases it can also be advantageously applied to other products, in which it is necessary to impart or improve wet strength characteristics, especially products based on cellulose fibers or to other types of materials based on nonwoven fibers.

[0017] In general the tissue paper can be composed of one, two or more plies that are joined together in a known manner, such as by ply bonding, embossing, gluing or the like, or by a combination of these techniques. The two or more plies can be fed from the same reel on which two or more plies are wound, or from different reels.

[0018] In a possible embodiment, the invention relates to a method for simultaneously producing rolls of wound web material having different characteristics to one another, comprising the steps of:

- ➢ simultaneously unwinding at least a first reel of a first web material and a second reel of a second web material;
- ➢ simultaneously feeding to a rewinder said first web material and said second web material;
- ➢ simultaneously winding a predetermined quantity of said first web material and of said second web material, forming two adjacent windings formed of said first and of said second web material;
- ➢ cutting said windings to form first rolls of said first web material and second rolls of said second web material.

[0019] In general the two or more web materials differ by one functional characteristic, and can be wound simultaneously in a winding cradle of a surface or peripheral rewinder, even without a central winding core. Rewinding machines of this type are known to those skilled in the art. In this case, two or more windings of web materials will form simultaneously and in axial alignment in the winding cradle.

[0020] Nonetheless, according to a particular embodiment of the invention, the method preferably provides that the first and the second web material are wound simultaneously on common winding cores, forming logs each comprising: a winding core; a length of said first web material wound in a first portion of the axial extension of said core; and a length of said second web material wound in a second portion of the axial extension of said core. In an advantageous embodiment, the logs thus configured are cut to form first rolls of a first web material and second rolls of a second web material.

[0021] In a possible embodiment of the method according to the present invention, the first and second rolls are fed to a common packaging machine, which forms packs comprising at least one of said first rolls and at least one of said second rolls.

[0022] To allow the paths of the web material to be arranged close to one another, it is advantageous for the reels to feed the web materials in the various paths to be unwound in separate unwinders, staggered along the extension of the converting line. However, it would also be possible for more than one reel to be disposed in the same unwinder aligned axially with one another.

[0023] The web materials fed in the various paths of the converting line can advantageously differ by at least one technical-functional characteristic. In the case of tissue paper, for example, a preferred embodiment of the invention provides for feeding web materials with different wet strengths, such as web materials with or without wet strength resins. This allows rolls of kitchen towel (with resins or other wet strength agents) and rolls of toilet paper (without or with small quantities of wet strength resins) to be produced in parallel and simultaneously.

[0024] Moreover, it would also be possible for the two or more web materials to differ by other characteristics, such as aesthetic characteristics, instead of or in addition to the technical-functional differences.

[0025] Along the respective paths the web materials can be subjected to the same process, or processes at least in part different for the two paths. For example, one or more of the following processes can be provided: embossing, printing, mechanical joining (ply-bonding). In the case of embossing in particular, the two or more web materials can be subjected to embossings that differ in pattern, density, engraving depth and/or other characteristics, also as a function of the degree of absorption, softness and depth that the finished material must have. Embossing can take place in distinct embossers for the two or more paths, or in the same embosser, if necessary provided with sector rollers, i.e. divided into different areas for the various paths. It would also be possible to arrange an embosser common to the various paths of the different web materials, and further individual embossers for the individual paths.

[0026] The web materials can each be composed of a single ply or of two or more plies. Preferably, the web materials can all have the same number of plies, for example two or three plies, joined to one another with one of the techniques known to those skilled in the art. However, it would also be possible to feed web materials that differ in number of plies in two distinct paths. For example, three plies can be used for one of the web materials and two plies for the other web material.

[0027] When a multi-ply web material is fed in a path, multi-ply reels can be used, i.e. on which two or more plies are wound, which are then preferably unwound and fed along coinciding or even partially different trajectories, for example to emboss two plies along the same path using two distinct embossing rollers of an embossing-laminating unit, in which they are then joined and sent to the rewinder.

[0028] Alternatively, two or more plies forming the

same web material can be fed from two or more separate reels, such as two plies from two single-ply reels, or three plies from three single-ply reels or also from one single-ply reel and one two-ply reel.

[0029] According to a possible embodiment, the invention relates to a system for converting tissue paper or other cellulose web material, comprising at least two adjacent paths for a first web material and for a second web material towards a rewinder. The rewinder is preferably disposed and controlled to produce, in parallel and adjacent to one another, windings formed of said first and of said second web material.

[0030] According to a preferred embodiment of the invention, the rewinder comprises an inserter of winding cores, and the first and second web material are wound simultaneously on common winding cores, forming logs each comprising: a winding core; a length of said first web material wound in a first portion of the axial extension of said core; and a length of said second web material wound in a second portion of the axial extension of said core.

[0031] Downstream of the rewinder there can advantageously be disposed at least one cutting machine to cut the products coming from the rewinder into a plurality of first rolls of a first web material and into a plurality of second rolls of a second web material.

[0032] Further features and embodiments of systems according to the invention will be described hereunder with reference to some non-limiting examples of embodiment, and are indicated in the appended claims.

[0033] According to a further aspect, the present invention relates to a pack of tissue paper products, comprising at least two products with different functional characteristics. The term functional characteristic is intended as a characteristic that influences the mode of use or properties of the product, including aesthetic properties. Functional characteristics in general can include: the form of the product (e.g. a product wound in a roll or a folded product); or the greater or lesser wet strength and therefore the presence or absence, or greater or lesser quantity, of wet strength agents; or the presence or absence of printed patterns or the presence of different printed patterns; the presence or absence of embossing, or the different shape of embossing; or yet again the different dimension of the products, etc. Products that differ from one another through a combination of functional characteristics can also be included.

[0034] According to a particularly advantageous embodiment of the invention, the pack comprises two types of cellulose products, preferably made of tissue paper, wound in a roll. According to a preferred embodiment, a first product is constituted by rolls of toilet paper and a second product is constituted by rolls of kitchen towel. In this case, the two products differ above all by the different dimension, i.e. the different axial length of the rolls. Typically, to facilitate packaging, the rolls of toilet paper will have an axial length equivalent to half that of the rolls of kitchen towel. The two types of roll will preferably also differ by further functional characteristics such as: the presence of resins or other wet strength agents in the rolls of kitchen towel and the absence (or presence in substantially lesser quantities) of these agents in the toilet paper; possible differences in embossing; possible differences in printed patterns.

[0035] Preferably, the ratio between number of rolls of toilet paper and number of rolls of kitchen towel will take into account, in addition to packaging needs, also the different consumption of these products in an average family. It has been found that consumption of rolls of toilet paper is typically higher than consumption of rolls of kitchen towel. For example, the pack can contain two rolls of kitchen towel and four rolls of toilet paper, or six rolls of toilet paper. Larger packs can have a multiple number of rolls of the two types of product.

Brief description of the drawings

[0036] The invention will now be better understood according to the description and accompanying drawing, which schematically shows possible non-limiting embodiments of the invention. More specifically, in the drawing:

Figure 1 shows a schematic side view of a portion of tissue paper converting line for simultaneous production of rolls or toilet paper and kitchen towel;
Figure 2 shows a plan view of the line in Figure 1;
Figure 3 shows a side view of a portion of the line according to the invention in a different embodiment;
Figure 4 shows a plan view of the portion of the line in Figure 3;
Figure 5 shows a plan view of a further embodiment of a tissue paper converting line according to the invention;
Figure 6 shows an axonometric view of a log obtained with the method according to the present invention; and
Figures 7 and 8 show two distinct packs of rolls according to the invention in two embodiments.

Detailed description of embodiments of the invention

[0037] Figures 1 and 2 show a side view and a plan view of a part of a possible tissue paper converting line according to the invention. More specifically, Figure 1 schematically shows the unwinders, an embossing-laminating unit and a rewinder, while Figure 2 schematically shows, besides the aforesaid elements, also a cutting machine positioned downstream of the rewinder.

[0038] More specifically, the line comprises a first pair of unwinders 1, 3 in which there are disposed two reels indicated with B_{A1}, B_{A2} respectively. The first reel B_{A1} dispenses a first ply V_{A1} along a first feed path towards a rewinder 5 to form, together with a second ply V_{A2} fed from the second reel B_{A2}, a first web material N_1.

[0039] In a second portion of the line there are disposed two unwinders 7 and 9 on which two reels B_{B1} and

B_{B2} are represented. The reel B_{B1} dispenses a ply V_{B1} along a second feed path, to form, with a ply V_{B2} dispensed by the second reel B_{B2}, a second web material N_2 fed, in parallel to the web material N_1, to the rewinder 5 along a second feed path adjacent to the first feed path of the web material N_1.

[0040] The rewinder can advantageously be a peripheral or surface rewinder, comprising three winding rollers 10, 12, 14, to which winding cores A are fed using a feeder 13, provided with a core inserter, towards the winding area formed of the three rollers 10, 12, 14.

[0041] The number 15 schematically indicates a cutting machine that cuts the logs formed by winding the web materials N_1 and N_2 fed simultaneously and in parallel to the rewinder 5 into rolls. The shape of the logs L formed by the rewinder 5 will be described in greater detail hereunder with reference to Figure 6.

[0042] Between the line section containing the unwinders 1, 3, 7, 9 and the rewinder 5 there is disposed an embossing-laminating unit 17 which, in the example illustrated, is configured as a tip-to-tip embosser. These embossers, of a type known per se, comprise a pair of embossing rollers 19, 21 cooperating with respective pressure rollers 23, 25 to separately emboss the plies fed from the reels. The number 27 indicates a glue applicator unit.

[0043] As shown schematically in the plan view in Figure 2, the two embossing rollers 19 and 21 are divided into two sectors indicated (for the roller 19) with 19A and 19B respectively. The two sectors 19A, 19B have a width substantially the same as the width of the plies V_{A1}, V_{A2} and V_{B1}, V_{B2} respectively. In substance, the two rollers 19, 21 have cylindrical surfaces provided with protuberances which can have different patterns in the sections or sectors 19A, 19B to obtain downstream of the embossing-laminating unit 17 web materials N_1, N_2 with different embossing patterns. These embossing patterns can differ from one another through a different pattern of the engravings on the sectors 19A, 19B, a different density, a different height, or any other characteristic that can distinguish the surface shape of the two sectors, both for the cylinder 19 and for the cylinder 21.

[0044] As shown schematically in the plan view in Figure 2, the log delivered from the rewinder 5 (better illustrated in the perspective view in Figure 6) is constituted by a central winding core A, made of plastic, cardboard or any other suitable material, removable if necessary, on which there are formed two windings indicated respectively with L_A e L_B. The two windings L_A, L_B are constituted by the same length of web material N_1 and N_2 respectively. Therefore, the winding L_A is formed of a certain length of plies V_{A1}, V_{A2} joined to one another in the embosser-laminator 17, while the winding L_B is formed approximately of the same length of web material N_2 constituted by joining the plies V_{B1}, V_{B2} embossed and laminated in the embosser-laminator 17.

[0045] Characteristically, the reels B_{A1}, B_{A2} are formed of plies V_{A1}, V_{A2} having at least one characteristic that distinguishes them from the plies V_{B1}, V_{B2} forming the reels B_{B1} and B_{B2}. For example, and in particular, the reels B_{A1}, B_{A2} can be formed of plies to which wet strength resins or other wet strength agents, which make the plies V_{A1}, V_{A2} suitable to produce kitchen towel, have been added. Vice versa, the reels B_{B1} and B_{B2} are formed, for example, of plies substantially without, or in any case containing minimum quantities of, wet strength resins, for producing toilet paper.

[0046] It must be understood that the widths of the plies V_{A1}, V_{A2} and V_{B1}, V_{B2}, and consequently the axial lengths of the windings L_A and L_B are purely indicative. The axial length of said windings and consequently the width of the plies of which they are formed are chosen as a function of the quantity of rolls to be obtained respectively with the plies V_{A1}, V_{A2} and with the plies V_{B1}, V_{B2}.

[0047] Inside the cutting machine 15 the movement of the devices to feed the log to the cutting unit and the movements of the cutting blade or cutting blades are controlled so as to divide the windings L_A, L_B into the desired number of rolls R_A and R_B (indicated briefly in Figure 2) of two different types and of two different dimensions. In the example shown, the rolls R_A have an axial length twice that of the rolls R_B. The former are constituted by rolls of kitchen towel, formed of plies V_{A1}, V_{A2} containing wet strength resins; instead, the rolls of lesser axial length are formed of plies V_{B1}, V_{B2} without or substantially without wet strength resins.

[0048] The cutting machine 15 is controlled so as to generate four head and tail trimmings for each log, located at the lateral surfaces of the windings L_A, L_B, so as to eliminate in each log the portions of winding L_A, L_B formed of the longitudinal edges of the plies V_{A1}, V_{A2}, V_{B1}, V_{B2}.

[0049] The rolls thus obtained can be packaged in mixed packs, as illustrated schematically in Figures 7 and 8. Figure 7 schematically shows a first pack containing two rolls R_A of kitchen towel of height A and eight rolls R_B of toilet paper, having a height B equivalent to half the height A.

[0050] Figure 8 shows a pack containing three rolls of kitchen towel R_A and six rolls of toilet paper R_B with the same dimensional ratio of heights A, B.

[0051] Consequently, it is understood that with the converting line illustrated briefly in Figures 1 and 2 it is possible to obtain, automatically and without operations performed by operators, mixed packs of rolls with characteristics and dimensions of two distinct types. It is in fact possible to used appropriate sorters to separate the rolls R_A and the rolls R_B downstream of the cutting machine 15 and send them appropriately to a packaging machine where, with means known per se, they are disposed according to the desired combinations for final packaging.

[0052] In the example illustrated in Figures 1 and 2 the plies V_{A1}, V_{A2}, forming the first web material N_1 and the plies V_{B1}, V_{B2} forming the second web material N_2 are fed from four respective single-ply reels B_{A1}, B_{A2}, B_{S1}, B_{B2}. However, it is known to those skilled in the art that

multi-ply reels, for example each containing two plies, can be produced in the paper mill. These are then sent along at least partially distinct trajectories in the converting line to be embossed, laminated, and then configured as multi-ply web material fed to the rewinder.

[0053] Figures 3 and 4 show schematically and limited to the section of line from the unwinders to the rewinder, a converting line designed according to the invention with the use of two-ply reels. In this embodiment, there are provided two unwinders 1 and 7, disposed staggered in machine direction (i.e. the direction of feed of the web material) and in transverse direction.

[0054] On the unwinder 1 there is positioned a two-ply reel indicated with B_A. V_{A1} and V_{A2} indicate the two plies which are unwound from the reel B_A and separated to follow two distinct trajectories towards the embossing-laminating unit 17. The embossing-laminating unit 17 comprises the same elements indicated with the same reference numbers as the embossing laminating unit 17 in Figure 1. Moreover, in this example of embodiment, a laminating roller 20 is also indicated, to show that this is an embossing-laminating unit of the nested type, in which lamination of the plies is performed downstream of the nip between the embossing rollers 19, 21, in a manner known to those skilled in the art.

[0055] Two plies V_{B1} and V_{B2} are unwound from the reel B_B, which are separated analogously to the plies V_{A1}, V_{A2}, to be fed along distinct trajectories to the two embossing rollers 19, 21.

[0056] Also in this case, just as in the example in Figures 1 and 2, logs comprising two windings L_A, L_B, each formed of a pair of plies will be obtained: the plies V_{A1}, V_{A2} for the winding L_A and the plies V_{B1}, V_{B2} for the winding L_B.

[0057] Figure 5 shows, limited to the plan view, an embodiment of the system according to the invention to produce embossed web materials using simple embossers. In this case there is illustrated a first unwinder 1 for a first reel B_A formed of two plies V_{A1}, V_{A2} which are fed to a first simple embosser 31 comprising a pressure roller 33 cooperating with an underlying embossing roller 35. In substance, the two plies V_{A1}, V_{A2} are not embossed separately and subsequently laminated, but joined by passing directly through the embossing nip between the roller 35 and the roller 33. Analogously, from a reel B_B there are unwound two plies V_{B1}, V_{B2}, which are embossed in an embossing unit 37 analogous to the embossing unit 31 and comprising a pressure roller 39 cooperating with an embossing roller 41. The pair of plies V_{A1}, V_{A2} forms a first web material N_1 fed to the rewinder 5, while the plies V_{B1}, V_{B2} form a second web material N_2 again fed to the same rewinder 5. The two web materials N_1 (V_{A1}+V_{A2}) and N_2 (V_{B1}+V_{B2}) form the two windings L_A, L_B on the common winding core A, to constitute the log L. This log is then cut into rolls R_A and R_B as described above to form packs of the type illustrated in Figures 7 and 8.

[0058] It is understood that the drawing only shows an example provided by way of a practical arrangement of the invention, and that said invention can vary in forms and arrangement without however departing from the scope of the concept on which the invention is based.

Claims

1. A method for simultaneously producing rolls of wound web material having different characteristics to one another, comprising the steps of:

   ➢ simultaneously unwinding at least a first reel of a first web material and a second reel of a second web material;
   ➢ simultaneously feeding to a rewinder said first web material and said second web material;
   ➢ simultaneously winding a predetermined quantity of said first web material and of said second web material, forming two adjacent windings formed of said first and of said second web material;
   ➢ cutting said windings to form first rolls of said first web material and second rolls of said second web material.

2. A method according to claim 1, wherein said first and said second web material are wound simultaneously on common winding cores, forming logs each comprising: a winding core; a length of said first web material wound in a first portion of the axial extension of said core; and a length of said second web material wound in a second portion of the axial extension of said core; and wherein said logs are cut to form first rolls of said first web material and second rolls of said second web material.

3. A method according to claim 1 or 2, wherein said first and said second rolls are fed to a common packaging machine, which forms packs comprising at least one of said first rolls and at least one of said second rolls.

4. A method according to claim 1, 2 or 3, wherein said first reel is unwound in a first unwinder and said second reel is unwound in a second unwinder.

5. A method according to one or more of the previous claims, wherein said first web material and said second web material differ by at least one technical-functional characteristic.

6. A method according to claim 5, wherein said first and said second web material differ by a different composition.

7. A method according to one or more of the previous claims, wherein said first web material and said sec-

ond web material are webs of cellulose material.

8. A method according to claim 7, wherein said first web material and said second web material differ by a different wet strength.

9. A method according to claim 8, wherein said first and said second web material differ by a different content of wet strength agents.

10. A method according to claim 9, wherein one of said first and second web material contains wet strength agents and the other of said web materials is without wet strength agents.

11. A method according to one or more of the previous claims, wherein said first web material and said second web material are both subjected to an embossing process between the respective unwinder and the rewinder.

12. A method according to claim 11, wherein said first web material and said second web material are subjected to two embossing processes differing from one another.

13. A method according to claim 11 or 12, wherein said two web materials are embossed in two distinct embossers.

14. A method according to claim 11 or 12, wherein said two web materials are embossed in the same embosser.

15. A method according to one or more of the previous claims, wherein said first web material has a width approximately corresponding to a first multiple of a base length and said second web material has a width approximately corresponding to a second multiple of said base length.

16. A method according to one or more of the previous claims, wherein said first web material and said second web material are each composed of a plurality of plies.

17. A method according to claim 16, wherein the plurality of plies of said first web material and the plurality of plies of said second web material are fed from a first and from a second multi-ply reel respectively.

18. A method according to claim 16, wherein the plurality of plies of said first web material and the plurality of plies of said second web material are fed from a first plurality of reels and from a second plurality of reels respectively.

19. A system for converting tissue paper or other cellulose web material, comprising at least two adjacent paths for a first web material and for a second web material towards a rewinder; said rewinder being arranged and controlled to produce, in parallel and adjacent to one another, windings formed of said first and of said second web material.

20. A system according to claim 19, wherein said rewinder comprises a winding core inserter, said first and second web material being wound simultaneously on common winding cores, forming logs each comprising: a winding core; a length of said first web material wound in a first portion of the axial extension of said core; and a length of said second web material wound in a second portion of the axial extension of said core.

21. A system according to claim 19, wherein downstream of said rewinder there is disposed at least one cutting machine to cut said first and said second winding into a plurality of first rolls of said first web material and into a plurality of second rolls of said second web material.

22. A system according to claim 20, wherein downstream of said rewinder there is disposed at least one cutting machine to cut said logs into a plurality of first rolls of said first web material and into a plurality of second rolls of said second web material.

23. A system according to claim 22, wherein said cutting machine is controlled to generate, for each log, four trimmings at the edges of said first and of said second web material wound on said common winding core.

24. A system according to one or more of claims 19 to 23, comprising for each of said at least two adjacent paths, at least one unwinder, to unwind at least a first reel of web material and at least a second reel of web material in said first and second path respectively.

25. A system according to one or more of claims 19 to 24, wherein at least two respective unwinders to unwind at least two reels in each path are associated with each of said at least two paths.

26. A system according to one or more of claims 19 to 25, wherein embossing members are disposed along said two paths.

27. A system according to claim 26, comprising a first embossing unit along said first path and a second embossing unit along said second path.

28. A system according to claim 26, comprising a single embossing unit through which said first and said second path pass.

29. A system according to claim 28, wherein said embossing unit has at least one embossing roller comprising two distinct portions of lateral cylindrical surface, corresponding to said first path and to said second path.

30. A pack of tissue paper cellulose products wound in rolls, comprising at least two types of products, distinct from one another.

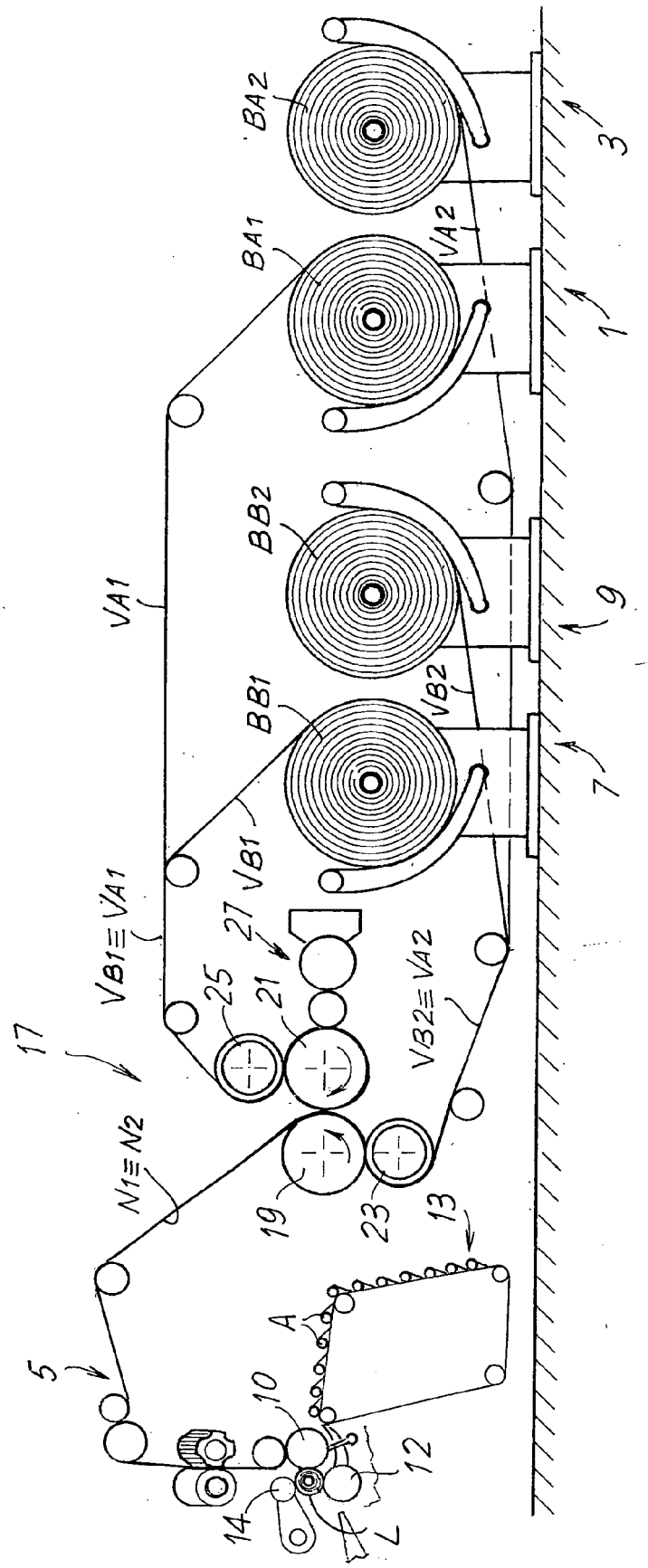
31. A pack according to claim 30, wherein said two types of products differ from one another by different wet strength.

32. A pack according to claim 30 or 31, wherein said two types of products differ from one another by different longitudinal dimension.

33. A pack according to one or more of claims 30 to 32, comprising at least one roll of kitchen towel and at least one roll of toilet paper.

34. A pack according to claim 33, comprising a number of rolls of toilet paper equivalent to double or to an even multiple of the number of rolls of kitchen towel.

35. A pack according to claim 33 or 34, wherein the roll or rolls of toilet paper have an axial length equivalent to approximately half the axial length of the rolls of kitchen towel.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VA1
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VB1
27
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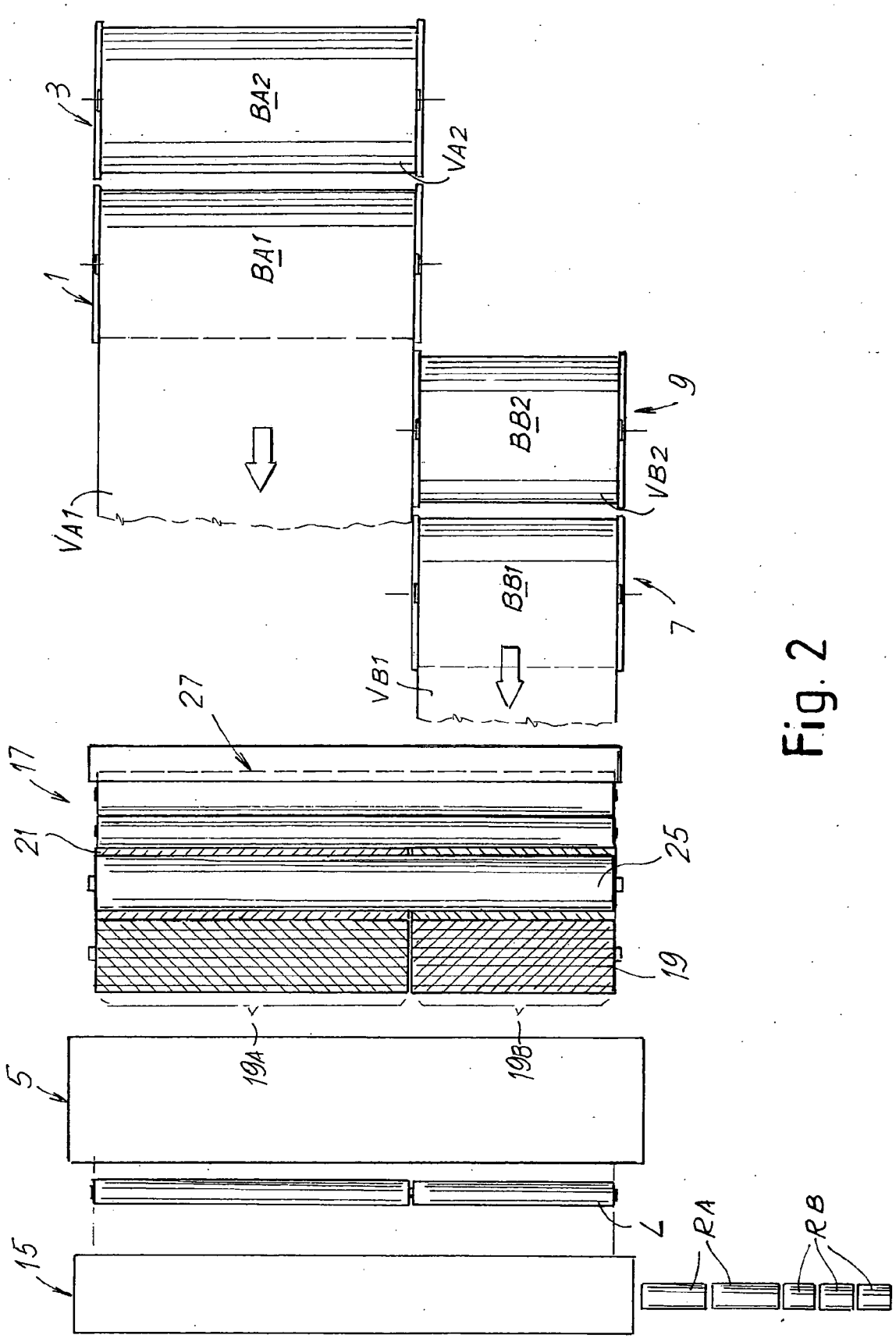
VB2≡VA2
N1≡N2
19
23
13
A
5
10
12
14

Fig. 1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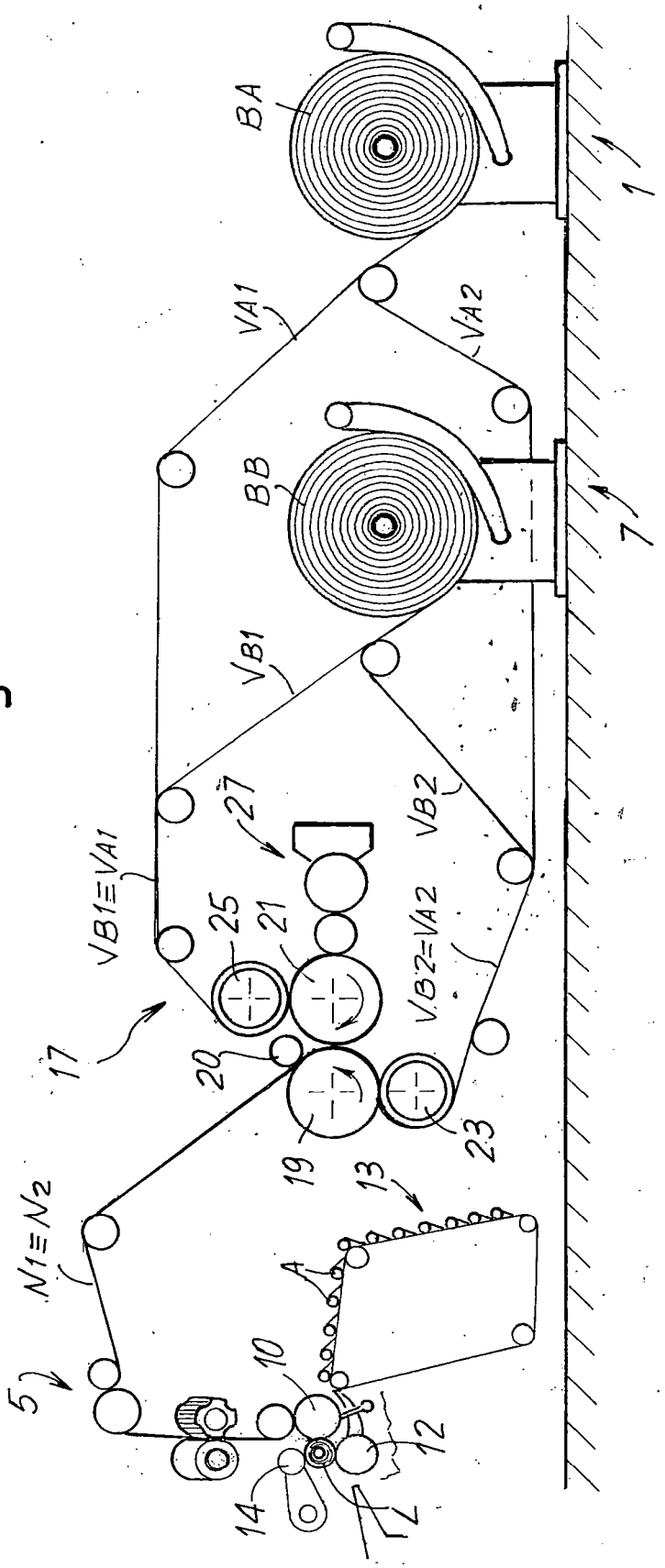
RA
RB

Fig. 2

Fig.3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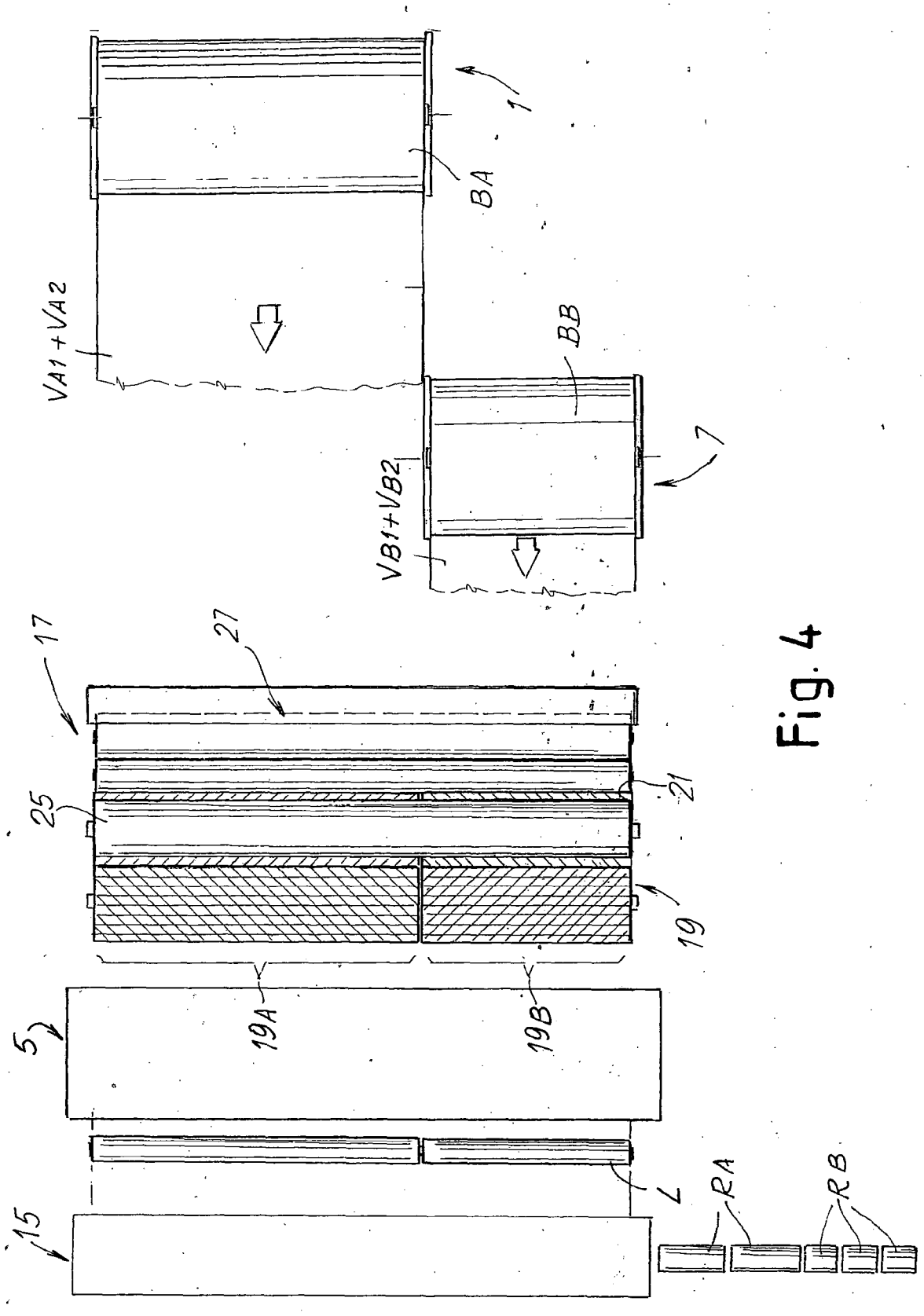

Fig. 4

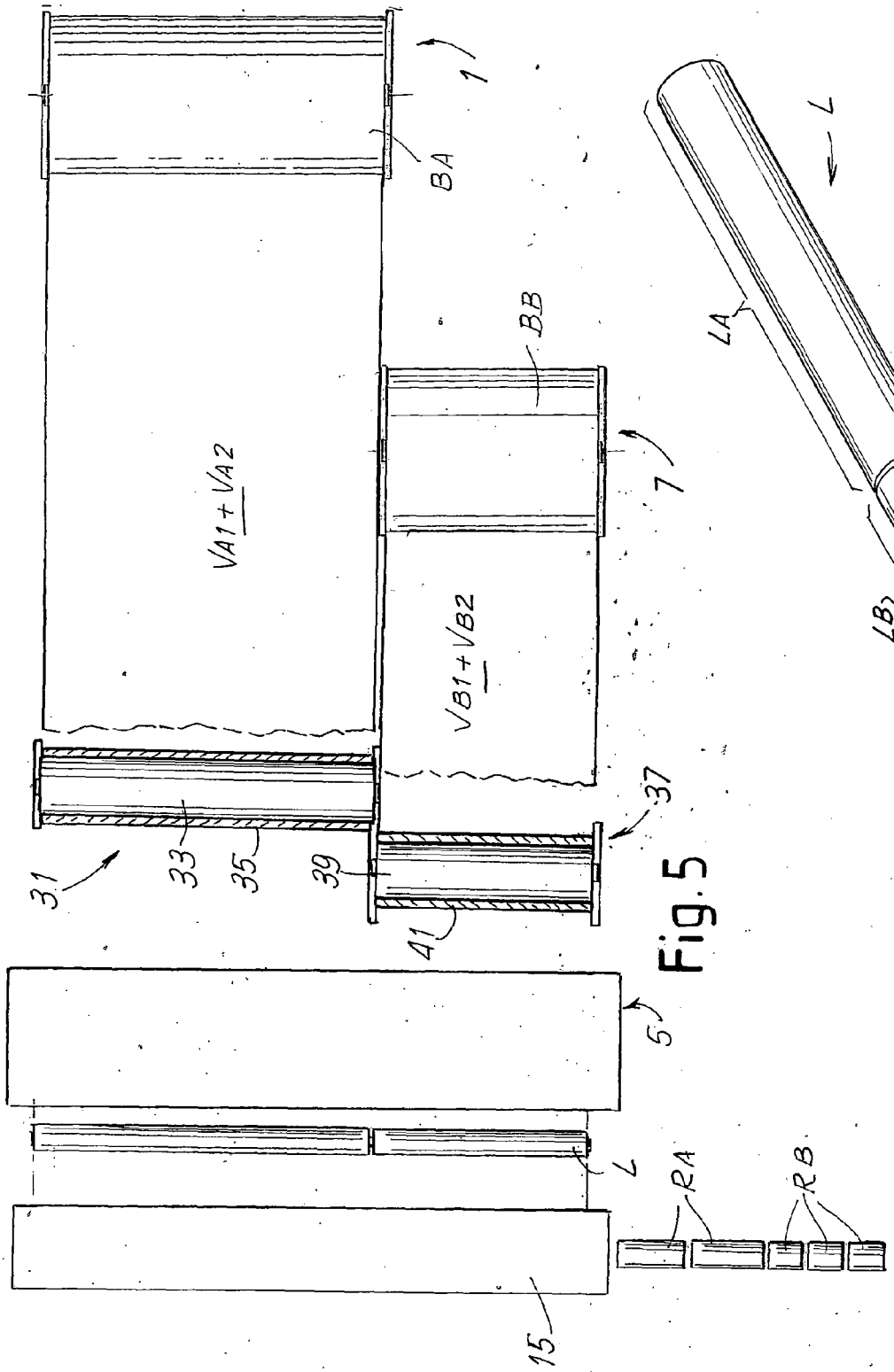

Fig.5

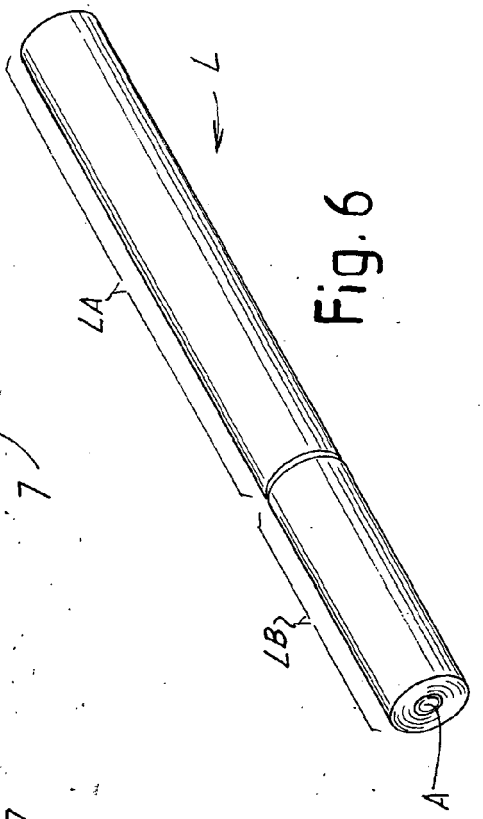

Fig.6

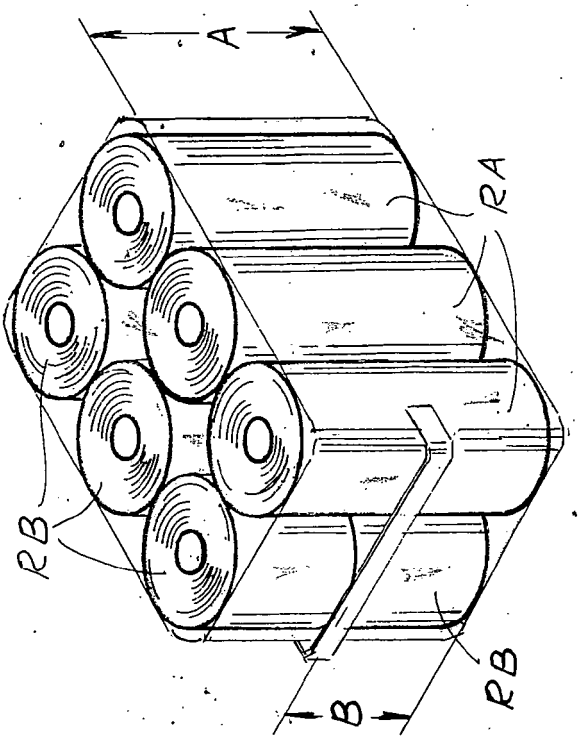

Fig. 8

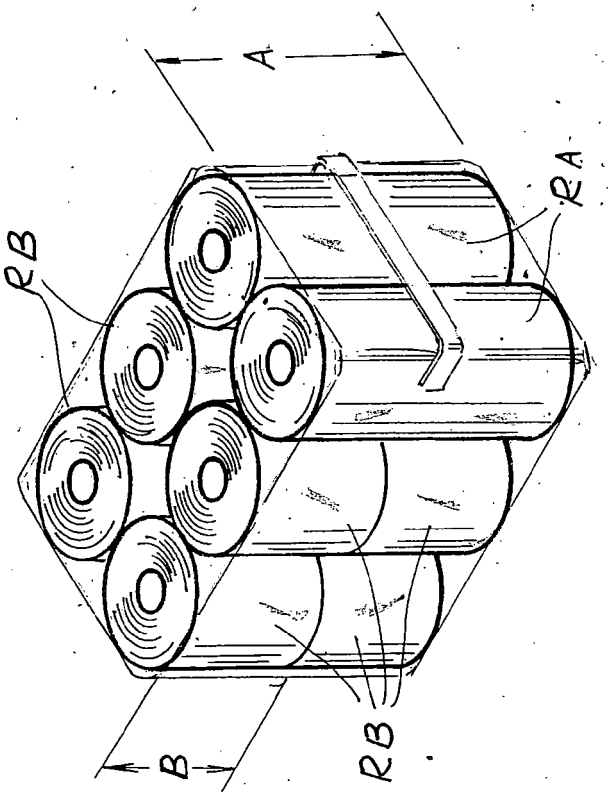

Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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